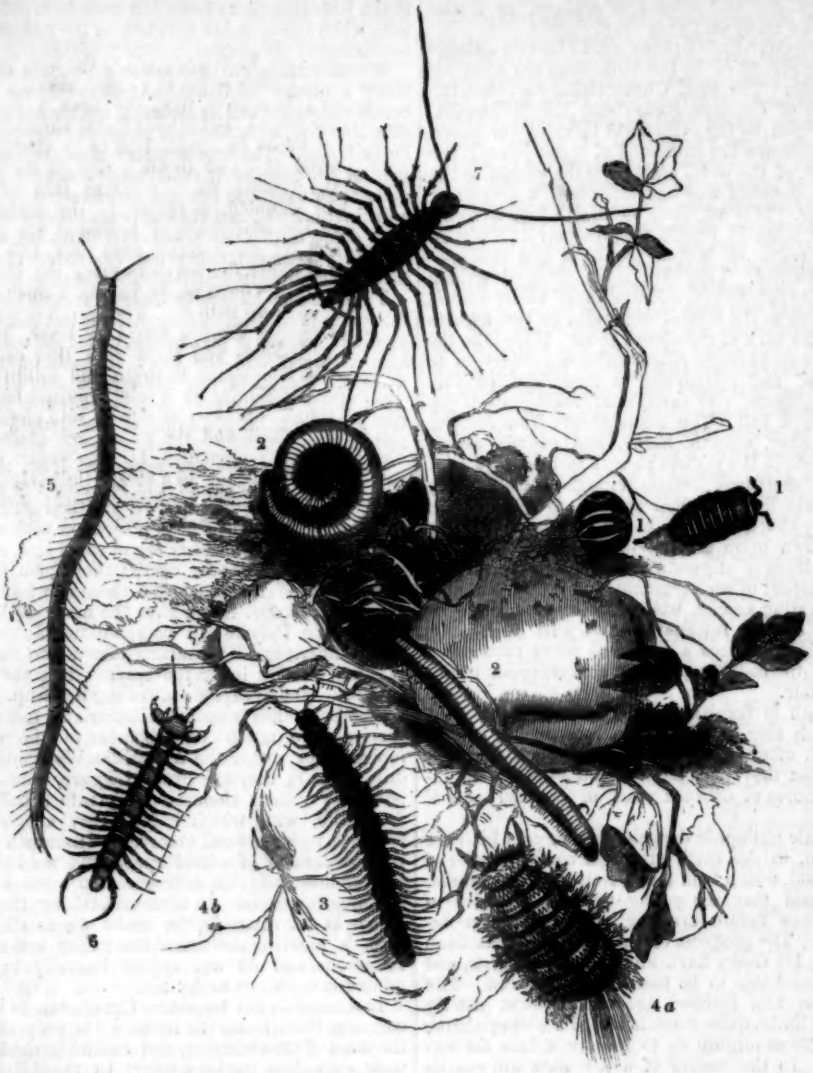

[1. Glomeris marginata, rolled up and extended; 2. Julus terrestris, rolled up and extended; 3. Polydesmus complanatus; 4. Pellyxenus: a, magnified; b, natural size; 5. Geophilus longicornis; 6. Lithobius forficatus; 7. Scutigera coleoptrata.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

CENTIPEDES AND MILLEPEDES.

The group at the head of the present article presents us with an association of creeping things, from which many turn with indifference, if not disgust, but which are nevertheless far from being destitute of interest. It must be confessed indeed that they are neither striking in their appearance nor obtrusive in their habits; they are creatures of darkness, and conceal themselves from observation. It is during the gloom and silence of night—

> "When the dew is on the grass,
> And the wisp on the morass,"

that they come forth from their lurking-places, and wander abroad in search of food; but with the dawn of day they seek the obscurity of their retreats. These creatures constitute a group termed by naturalists Myriapoda, the first order of insects according to M. Latreille, but really forming a distinct section or class, of the subkingdom articulata, and displaying affinities to the crustacea, scorpions, and insects, yet distinguished by characters of their own. They are composed of a series of distinct segments, and to every segment is appropriated one pair of limbs; sometimes indeed two pairs.

The head is furnished with jaws, antennæ, which are regarded as feelers, and eyes either simple or compound. Respiration is effected through spiracles, as in insects, whence air-tubes ramify over the internal viscera. Like insects, they undergo a metamorphosis, or rather several changes before acquiring their perfect form; and the sexes are distinct.

Their movements are winding and serpentine; some are slow, gliding gently along; others, on the contrary, are active and rapid in the extreme. They feed on

decayed vegetable and animal substances, on fruits, roots, &c., and many on living prey.

The Myriapoda resolve themselves into two distinct tribes, one represented by the Millepede, the other by the Centipede. The first, Chilognatha, Latreille, the genus Julus of Linnæus, comprising the Millepedes, is characterized by the cylindrical form of the whole body; the antennæ are composed of seven joints; the first segment of the body, sometimes the second, is the largest, and presents the appearance of a corslet or little buckler. It is not until the fourth year in some, the fifth or sixth in others, that the pair of limbs on the several segments become doubled, and that maturity is attained. They live upon decayed animal and vegetable substances, and are found under stones, in the ground, at the foot of old walls, in the fissures and under the bark of time-worn trees. If we take the Millepede as an example of this tribe, we observe it to be elongated and cylindrical in form, divided into rings or segments, and capable of rolling itself up spirally into a ball. The segments are from forty to fifty in number, smooth, horny, and convex above. Each segment in the perfect animal is furnished with two pairs of short legs (certain segments excepted), by means of which the animal appears to glide along, without any effort, the legs being almost invisible as we look down upon the moving creature. The respiratory orifices or stigmata are placed on the sternal (or lower) aspect of each segment, and lead to a double series of aerating sacculi, whence tubes emerge, to be distributed on the internal organs. In addition to these breathing orifices a series of pores runs down each side of the body, exuding an acid secretion of unpleasant odour.

The mouth is furnished with two stout horny jaws, one on each side, as we see in caterpillars, acting against each other; their cutting edges are serrated, in order that they may be rendered effective in dividing the fibres of decayed wood, or the dead roots of plants.

The female millepede deposits her eggs, which are very minute, in the earth or in the earthy powder of decayed wood, which is in fact a rich vegetable mould. We have said that the young undergo a series of transmutations before arriving at their perfect development. The progress of these changes has been watched by De Geer, Savi, and other zoologists, and are too remarkable to be passed by unnoticed. The young when first hatched are very minute, utterly destitute of limbs, quite smooth, and of a kidney shape, but of course so minute as to require a lens for examination. In the course of a few days afterwards they undergo a sort of moult, changing the skin, and then appear divided into about eight segments; a pair of simple eyes appears on the head, which is furnished also with two antennæ; the three segments following the head have each a pair of limbs. In a few days a second moult takes place, the body is enlarged, the number of segments increased, and the number of limbs augmented to seven pairs, one pair on each segment succeeding the head. At the age of a month, or thereabouts, a third change takes place, and the millepede appears with twenty-two segments and twenty-six pairs of feet, but of these the anterior eighteen pairs only are used in progression. The general form and aspect now approximates to that of the adult. Some time now elapses before the fourth moult, which gives thirty-six pairs of legs. Subsequently the male acquires thirty-nine rings, and the female sixty-four, with two pairs of limbs to every segment. But after this, two years elapse before the perfect development and maturity of the animal is completed.

Such is a summary of the observations recorded, to which it may be added, that the changes from the first to the fifth take place from the month of March, the time when the eggs are hatched, to the end of July or beginning of August.

Whether these changes are as precise as stated, we think a matter of doubt. At all events we have recently examined and sketched a female Julus of considerable size, with forty-six rings, and eighty-two legs on each side. The first segment after the head had a pair of limbs on each side, that is a double pair altogether; between the first and second segment appeared a distinct orifice; and then appeared only one limb on each side; to this succeeded two limbs on each side for every segment, excepting the three caudal segments, which were destitute of limbs.

The common Millepede (Julus terrestris) is too well known to need description; it lives in light vegetable mould in gardens or plantations, under old walls, stones, logs of wood, and the like: it feeds on vegetable matters. Our European Millepedes are all of small size; there is, however, a species found in Brazil, the Julus maximus, Linn., of the length of seven inches.

Certain millepedes are separated from the genus Julus, in consequence of the form of the segments, which are not only less convex, but their outer margin is reflected up, and forms a projection with a point at its posterior angle. They are of small size, and found in damp places in the earth: they form the genus Polydesmus of Latreille. To those in which the eyes are apparent, Dr. Leach gave the name of Craspedosoma. The Polydesmus complanatus (Julus complanatus, Linn.) is by no means uncommon in gardens. It is more active in its movements than the common millepede, and is capable of rolling itself up.

Another genus is termed Glomeris by Latreille. The species have much resemblance to the woodlouse (oniscus), or rather the Armadillo Woodlouse (Armadillo, Latr.); they are oval in figure, and have the power of rolling themselves up into a ball, like the Armadillo, with which indeed they are often confounded by superficial observers; insomuch that from the comparison of actual specimens, we have drawn out the most palpable differences, to serve as a guide to young inquirers. In Glomeris, taking the Pill Millepede as our example, the limbs are small, and arise from a median abdominal line; they are short and numerous, and do not appear laterally beyond the jointed carapace or backplate.

In Armadillo (an Isopodous Crustacean, as is also the common Woodlouse) the limbs are large, proceed from the sides of the abdomen, and extend beyond the back plate, excepting the hind pair. In the Pill Millepede (Glomeris) the head is larger and more concealed, the antennæ are short and end club-shaped.

In the Armadillo Woodlouse the antennæ are longer and filiform or pointed.

In the Pill Millepede the shelly covering is firm; in the Armadillo much softer, as in Oniscus. The terminal segment of Glomeris is large, of Armadillo small and triangular. In the latter the lateral edge of the dorsal armour along each side is serrated, in the former continuous.

The Glomeris, or Pill Millepede, is black, with yellow margins to the rings or segments. Armadillo is yellowish-grey clouded with brown, or brown with yellow blotches; it exceeds the Pill Millepede in size. Both are common, and roll themselves up in the form of balls, and were formerly used in medicine. A species of Armadillo from Italy (A. officinalis) was employed on the Continent. The Pill Millepede, Glomeris marginata, Leach (Julus ovalis, Linnæus), is found under stones and amongst moss, and in the same situations as the common Millepede. Both the Pill Millepede and the Armadillo Woodlouse are abundant

in the writer's garden; they feed on decomposed vegetable matters.

There is a singular little creature, the Jule à queue en pinceau, found in hothouses, under frames, under the bark of aged trees, and in the fissures of walls, which was placed by Linnæus in the genus Scolopendra; it belongs, however, to the present section, and constitutes the genus Pollyxenus of Latreille. At first sight it appears very like the larva of that beetle well known from its destructive habits in museums, viz. the Anthremis Musæorum: it is oblong in form, with tufts of little scales along the sides, and a pencil of hairs at the tail. There are twelve pairs of limbs. It is the only known species, and was termed Scolopendra lagura by the older writers. It varies in size from a line to two lines and a quarter in length; the body is brown; the head black; the caudal pencil of hairs white. Like the Juli, in general it feeds on decomposed vegetable substances. In one important point, however, it differs from the true Millepedes: the body is not invested with firm shelly plates, but is soft, and covered by a membranous investment. Like the Woodlouse, it is gregarious, numbers collecting together in the same hiding-place. We may here observe that the common Millepede and Pill Millepede are gregarious; but, as far as our own observations go, not the Polydesmus complanatus or flat-backed Millepede, which, in some respects, approaches in its manners as it does in its appearance to the predatory Centipedes, which are solitary, like carnivorous beings in general.

The second family of Myriapods (Chilopoda, Latreille) comprehends the Centipedes, &c.

Of these voracious creatures several species are well known in our island, but it is in the hotter regions of the earth that they are the most numerous and attain to the largest dimensions.

In the Centipedes or Scolopendræ the body is long and flattened, and covered above by a series of dorsal plates, and below by a separate series, the sides being simply membranous. This provision admits of snake-like flexibility and of that rapidity of motion for which these Centipedes are so notorious. They are in fact daring and active carnivorous animals, preying upon insects and worms. Night is their season of activity; during the day they lie concealed under stones, beams of timber, in holes amidst brick-work, or even in the ground. Fitted for a life of rapine, they are very formidably armed; our British species indeed, though not very pleasing in appearance, are at all events not to be dreaded; but when we go into warmer climates, we find these creatures terrific from the wounds they inflict. If we examine them, we see that the mouth is not only provided with horny jaws as in insects, but with two terrible fangs jointed in the middle, sharp at the points, and perforated near the tip by a minute orifice through which a poisonous fluid is instilled into the wound, and which, in some species of large size tenanting India, South America, &c., often produces the most severe consequences, if not death. We have measured a specimen twelve inches in length and one inch and a quarter across the largest back plates; but if Ulloa be not indulging in extravagance, it was a pigmy to those of which he talks, and which he says measured a yard in length and five inches in breadth, inflicting a mortal wound. Let not our reader suppose that we give full credence to this statement; but be this as it may, the annoyance which these creatures cause to Europeans visiting intertropical climates is of no trifling account. They creep into houses, lurk under articles of furniture and behind wainscots, hide themselves in drawers and similar places, and sometimes in beds, to the disgust and apprehension of all not familiarized with their presence. In the south of France, Spain, and Italy, a large species (Scolopendra cingulata, Latr.) is very common. In our country, among the species of small size which are indigenous, the most common is the forked Centipede, Lithobius forficatus (Scolopendra forficata, Linn.); it is found in the earth under stones, and is quick and active in its movements. The limbs are fifteen on each side. The general colour is tawny red. Length about an inch and a quarter, sometimes more.

A group of Centipedes, distinguished by the generic title of Geophilus, presents us with several species remarkable for their great length and slenderness and the number of their limbs, which exceed forty-two on each side. They are tortuous in their movements, and by no means so rapid as the ordinary Centipedes; they live in the earth, and make their way through the minutest fissures or apertures with the utmost facility. Of the slender animals of this genus most, if not all, are phosphorescent, and gleam in the dark, though not so intensely as the Glow-worm. The Geophilus electricus may be often seen at night during the summer months on the grass of lawns or on garden walks, palely glistening like a luminous thread as it winds its tortuous way. The long-horned Geophilus (G. longicornis) is another species by no means uncommon; it is larger than the G. electricus, and broader in proportion. Under the genus Scutigera are placed certain strange-looking Centipedes, found in the south of France, in southern Europe, Madeira, &c., remarkable for the length of their limbs. None have yet been found on our island. The back is plated with eight scales, thickened behind and notched; the body beneath is divided into fifteen semirings, each carrying a pair of legs, with long and slender terminal joints; the eyes are large and compound; the antennæ long. The European species, Scutigera coleoptrata, is very active, running with great quickness; it conceals itself behind the beams and wood-work of houses, emerging at night, and traversing the floors in quest of food. India and America have their respective species, and they are among those unwelcome intruders which annoy the European, who is not easily reconciled to the presence of centipedes, scorpions, and scutigeræ in his apartments.

The subjects represented in the engraving are—1, the Pill Millepede (Glomeris marginata); 2, the common Millepede (Julus terrestris); 3, the flat Millepede (Polydesmus complanatus); 4, the Pollyxenus, or brush-tailed Millepede—*a*, magnified; *b*, the natural size; 5, the long-horned Centipede (Geophilus longicornis); 6, the common Centipede (Lithobius forficatus); 7, the Scutigera coleoptrata.

Mogadore.—Mogadore, or Suera, as the Moghrebins call it, the port of the town of Marocco, lies on the seashore between Cape Cantin and Cape Gher. It was founded in 1760. Mogadore is built on a low shore, consisting of moving sand, which extends from five to fifteen miles inland, where a fertile country begins. It is regularly built, the streets being straight, but somewhat narrow. The Europeans settled here have erected several large buildings in the African style. The town is divided into two parts, one of which is called the Fortress, and contains the custom-house, the palace of the Pasha, the other public buildings, and the houses of Europeans; the other part is only inhabited by Jews. The harbour is formed by a small island, lying south-west of the town, and about two miles in circumference. At low tides there are only ten or twelve feet water in the harbour, and large vessels are obliged to anchor without, at a distance of two miles. The commerce of this place with London, Amsterdam, Cadiz, Leghorn, Genoa, the Canary Islands, Hamburg, and the United States of America, is considerable. The population is ten thousand, according to Jackson; or seventeen thousand, according to Graberg.—*Penny Cyclopædia.*

[Andrea del Sarto, and Group from the Madonna del Sacco.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XXXI.

Andrea del Sarto.

Andrea Vannucchi was the son of a tailor (in Italian *Sarto*), hence the appellation by which he was early known, and has since become celebrated: he was born in 1478, and, like many others, began life as a goldsmith and chaser in metal, but soon turning his attention to painting, and studying indefatigably, he attained so much excellence that he was called in his own time "Andrea senza errori," that is, Andrea *the Faultless*. He is certainly one of the most fascinating of painters, but in all his pictures, even the finest, while we are struck by the elegance of the heads and the majesty of the figures, we feel the want of any real elevation of sentiment and expression. It would be difficult to point out any picture of Andrea del Sarto which has either simplicity or devotional feeling.

A man possessed of genius and industry, loving his art, and crowned with early fame and success, ought to have been through life a prosperous and a happy man. Andrea was neither:—he was miserable, unfortunate, and contemned through his own fault or folly. He loved a beautiful woman of infamous character, who was the wife of a hatter; and on the death of her husband, in spite of her bad reputation and the warnings of his best friends, he married her: from that hour he never had a quiet heart, or home, or conscience. He had hitherto supported his old father and mother: she prevailed on him to forsake them. His friends stood aloof, pitying and despising his degradation. His scholars (and formerly the most promising of the young artists of that time had been emulous for the honour of his instructions) now fell off, unable to bear the detestable temper of the woman who governed his house. Tired of this existence, he accepted readily an invitation from Francis I., who, on his arrival at Paris, loaded him with favour and distinction; but after a time, his wife, finding she had no longer the same command over his purse or his proceedings, summoned him to return. He had entered into such engage-

ments with Francis I. that this was not easy: but as he pleaded his domestic position, and promised, and even took an oath on the Gospel, that he would return in a few months, bringing with him his wife, the king gave him licence to depart, and even intrusted him with a large sum of money to be expended in certain specified objects.

Andrea hastened to Florence, and there, under the influence of his infamous wife, he embezzled the money, which was wasted in his own and his wife's extravagance. He never returned to France to keep his oath and engagements. But though he had been weak and wicked enough to commit this crime, he had sufficient sensibility to feel acutely the disgrace which was the consequence; it preyed on his mind and embittered the rest of his life. The avarice and infidelity of his wife added to his sufferings. He continued to paint, however, and improved to the last in correctness of style and beauty of colour.

In the year 1530 he was attacked by a contagious disorder; abandoned on his death-bed by the woman to whom he had sacrificed virtue, fame, and friends, he died miserably, and was buried hastily, and almost without the usual ceremonies of the church, in the same convent of the Nunziata which he had adorned with his works.

Andrea del Sarto can only be estimated as a painter by those who have visited Florence. Fine as are his oil-pictures, his paintings in fresco are still finer. One of these, a Repose of the Holy Family, has been celebrated for the last two centuries, under the title of the *Madonna del Sacco*, because Joseph is represented leaning on a sack. There are engravings of it in the British Museum.

[St. Joachim.]

The cloisters of the convent of the Nunziata, and a building called the Scalzo, at Florence, contain his most admired works. His finest picture in oil is in the Florence Gallery, in the cabinet called the Tribune, where it hangs behind the Venus de' Medici. It represents the Virgin seated on a throne, with St. John the Baptist standing on one side and St. Francis on the other; a picture of wonderful majesty and beauty. In general his Madonnas are not pleasing; they have, with great beauty, a certain vulgarity of expression, and in his groups he almost always places the Virgin on the ground either kneeling or sitting. His only model for all his females was his wife; and even when he did not paint from her, she so possessed his thoughts that unconsciously he repeated the same features in every face he drew, whether Virgin, or saint, or goddess. Pictures by Andrea del Sarto are to be found in almost all galleries, but *very* fine examples of his art are rare out of Florence. The picture in our National Gallery, attributed to him, is very unworthy of his reputation. Those at Hampton Court are not better. There is a fine portrait at Windsor. In the Louvre is the picture of Charity, No. 85, painted for Francis I. when Andrea was at Fontainebleau in 1518, and three others. Lord Westminster, Lord Lansdowne, Mr. Munroe of Park Street, and Lord Cowper in his collection at Panshanger, possess the finest examples of Andrea del Sarto which are in England. At Panshanger there is a very fine portrait of Andrea del Sarto by himself: he is represented as standing by a table at which he has been writing, and looking up from the letter which lies before him. The figure is half-length, and the countenance noble, but profoundly melancholy. One might fancy that he had been writing to his wife.

THE ENGLISH AND IRISH ORDNANCE SURVEYS.

There are occasionally notices in parliament, either in the form of "estimates" or of answers to questions, of the *Ordnance Survey*. What this survey may mean, and how parliament comes to be connected with it, are matters not by any means generally known. A few explanatory details, sufficient to give a general understanding of the object in view, may not be misplaced.

An ordnance survey, or a trigonometrical survey (for the two names signify the same thing), is a minute examination of the surface of a country for the purpose of laying down an exact delineation of its geographical features; the positions of its mountains, valleys, lakes, rivers, forests, marshes, &c.; the heights of its mountains; the contour of its coasts; the artificial boundaries of the country into counties, hundreds, baronies, &c.:—this is the grand object of such a survey. It is an *Ordnance* survey, because in this country it is superintended and carried on by officers of the Board of Ordnance; it is a *Trigonometrical* survey, because it is effected chiefly by the measurement of triangles, according to the rules of trigonometry. For no other purpose whatever is a country so thoroughly examined as for this survey. Not only is every plain, every mountain, every valley visited, but every field and hedge is brought under the immediate cognizance of the surveyors. The result may either be the determination of a number of distinct positions, which admit of being described in a book, or the marking of all the boundaries and other features in such a manner as to facilitate the construction of a map; both objects may be combined, but generally speaking it is understood that the main object of such a survey is the preparation of maps of such undoubted accuracy as to serve as standards in all investigations which concern the geographical and territorial divisions of a country.

It must not be imagined that such a survey is the work of a year or two merely, or of a dozen years. Nothing but a surveying force amounting almost to an army would be adequate to the trigonometrical survey of a country in a few years. Half a century

has been already expended in the survey of Great Britain, and it is yet far from completion; and, so great is the importance of this survey deemed, and so much greater would that importance be if the *scale* of the survey were of greater magnitude, that the maps in future are to be published on a scale of six inches to a mile, and of those already done the country will probably be re-surveyed and completed on the same scale.

The Ordnance Survey of Ireland is the most minute and complete that has ever been effected, or carried on nearly to completion: but before we can understand its general character, we must notice the survey of England, which preceded it, and apprenticed the officers to the necessary arrangements for its practical conduct.

About a century ago, when the English government had to watch narrowly the proceedings of the Young Pretender and his friends in Scotland, it was deemed important to establish military posts, and to open roads of communication through the remotest parts of Scotland; and a body of infantry having been encamped with a view to facilitate this object, Lieutenant-General Watson, who was then officially employed as deputy quartermaster-general, conceived the idea of making a map of the Highlands. This was the first germ of the trigonometrical survey of later times. The Duke of Cumberland, who commanded the troops in Scotland, approved of the idea, and employed General Roy to carry it out. The survey was commenced; and as its promised utility was seen to be great, it was extended beyond the limits at first intended, and by degrees included the whole of Scotland. The breaking out of the Seven Years' War, however, by distracting the attention of the government from home improvements, put a stop to the survey, and the map resulting from the labours already bestowed was never published. The survey answered the purpose for which it was immediately intended, in assisting the works of the government engineers, but it was not minute or complete enough for other purposes.

When the Seven Years' War was concluded, the project was started of making a general survey of the whole island on an improved scale and with more perfect instruments. Nothing was, however, done in the matter for some years; but it was afterwards revived by indirect means. It is a point of importance to astronomers that the exact positions of their observatories, with reference both to one another and to their respective latitudes and longitudes, should be laid down with rigorous accuracy; and General Roy undertook a series of surveys and measurements with a view to attain this accurate determination of the relative positions of Greenwich Observatory and other observatories near London. Cassini, an eminent astronomer on the Continent, about the same time proposed to the English government a survey for the purpose of determining the relative positions of the Paris and Greenwich observatories; and as the Royal Society warmly supported this proposal, the government undertook to defray the necessary expense, and intrusted General Roy with the management of the enterprise. This was the commencement of the real trigonometrical survey, for it matters not whether two points selected be observatories, churches, or the summits of mountains; if it be wished to determine their exact distance and relative positions, the mode of obtaining the requisite measurements will be the same.

It will perhaps seem strange to those unaccustomed to the subject, that the accurate measurement of *one* line should form the groundwork for the whole of the measurements throughout a country—yet so it is. If a church, a hill, and an obelisk are visible from each other, and if the distance from one to a second (say from the church to the hill) can be accurately measured, then the distances from the church to the obelisk and from the hill to the obelisk can be determined *without measurement*. there are instruments, such as the theodolite, which will measure all the angles of the triangle formed by the three objects; these angles, together with the known length of one side of the triangle, when brought to bear in certain trigonometrical calculations, will give the exact lengths of each of the other two lines. Each of these sides may then be made the *known* side of a new triangle, by bringing in some new conspicuous object, such as a second obelisk or a second church; and thus the triangulation, or formation of new triangles, goes on, until the whole country is covered with a network of lines, the length of every one of which is known with the most rigorous accuracy, although none of them may have been accurately measured except the first one. It requires an extension beyond our every-day ideas to conceive a line whose length is accurately known without being actually measured; but this is the very gist of the subject.

As everything depends on the original or *base* line, the slightest error in the length of this line will affect every single calculation afterwards; and the more so, the farther it is removed from the beginning, since the error will multiply itself in every successive triangle. Hence the determination of this line is the primary and the most important part of the surveying operations. In the common measurements by a rule or a string or a chain, for manufacturing or commercial purposes, a sufficient approach to correctness is obtained; but in a base-line for a survey, where an error of one inch in a mile would be serious, the difficulties of ensuring accuracy are almost inconceivable. Every substance employed as a measure will expand and contract by variations of heat: every rod which seems straight to the eye has some flexure or other; and every observer has peculiarities of eye or of discrimination which may lead him to results not quite accordant with those of other observers.

We shall thus be prepared to believe that the accurate measurement of a base-line was the object of General Roy's first attention. He selected Hounslow Heath as the spot where this line should be made. His measuring instrument consisted of three deal rods, on which lengths of twenty feet were laid off by Ramsden, and a standard rod, with which the former were from time to time compared. These rods were so strengthened as to be rendered as inflexible as possible. The weather, however, proved very wet and unfavourable; and the deal rods were subject to so much expansion and contraction, that their length on one day was no criterion as to their length on another. Whereupon General Roy resolved to employ glass rods as being less subject to expansion. Three hollow glass tubes, perfectly straight, were accordingly prepared; they were twenty feet long by an inch in diameter. They were graduated by Ramsden, and were inclosed in cases so as to prevent them from bending, but not from expanding or contracting. In the month of August, 1784, the measurement was effected with these glass rods. The distance measured, or the length of the base-line, was about twenty-seven thousand feet (rather over five miles); and the length as measured by the glass rods differed by about twenty inches from that given by the deal rods—a trifling quantity, as it may appear to most persons, but of importance in reference to the object in view. Many minute corrections were made, and the final result stated to so minute a quantity as the ten-thousandth part of a foot.

A base-line being thus formed, the triangulation commenced. The summits of lofty hills, obelisks, and

church steeples, lighthouses, and artificial beacons, were selected as points for triangles, and the various angles and lines were determined one by one. The French astronomers made observations across the Channel to the English coast; the English observers did the same in respect to France; and thus the two countries were included in the same triangulation. The immediate object was answered, by determining, within a near approach to accuracy, the relative positions of the observatories at Paris and Greenwich.

General Roy died in 1790; and soon afterwards a regular survey of England was commenced under the orders of the Ordnance Office. The first thing was, to remeasure the base-line on Hounslow Heath. This was effected by means of two steel chains of exquisite construction, graduated to a certain length. The length was found slightly different from that determined by General Roy, and the new length was thenceforward adopted. Then commenced the triangulation. Elevated spots, such as Beachy Head, Dunnose, Hanger Hill, &c., were chosen as stations, and the distances of these, one from another, were determined by observation and calculation. Year after year something was added to the results obtained: at one time a new base was measured, to verify the old one; at another time arcs of the meridian were determined, and new districts of the island were gradually brought within the scope of survey. Colonel Colby was placed at the head of the survey in 1809, a position which he has occupied ever since, working out this great object as rapidly as the funds placed at his disposal would admit.

When the country was parcelled out into certain great triangles, these were subdivided into smaller ones, and these into smaller again, so that at length every minute spot was laid down and calculated to its true position. It was an astronomical operation to determine the latitude and longtitude of particular spots, and all the resources of mathematical and geodesical science were requisite in determining the great triangles accurately; but when these were once determined, the smaller triangulation approached nearer to the character of land-surveying, and required skill of a less exalted kind, such as is noticed in some of our former Numbers.

It was part of the plan of the Ordnance Survey to have correctly engraved maps of the whole of the kingdom. This plan has been gradually carried out during the time that Colonel Colby has been at the head of the survey. There is a regular establishment of draughtsmen and engravers in the pay of government, who have been for many years engaged in preparing for publication the maps resulting from the survey. All the maps are in uniform style. They contain every road, pathway, stream, hill, &c. in the kingdom, and are beautiful specimens of close engraving. The scale is uniformly that of one inch to a mile; and it is printed in sheets in such a manner that these might be placed edge to edge, without any repetitions; so that the whole of England and Wales would form a splendid map thirty feet high by twenty-four or five in width. All the southern part of the kingdom has been published for many years; but much yet remains to be done in the north, near Scotland; while Scotland itself is yet wholly unpublished.

These maps are each somewhere about thirty inches long by twenty-four in width; and the government has established an office where they are sold at about seven or eight shillings each. Some of them are divided into quarters, which sell at about two shillings each; and purchasers have thus sometimes the opportunity of procuring a portion of the map, relating to a particular spot, at a very cheap rate. Thus, one of these quarter-sections, measuring about fourteen inches by twelve, contains the whole of the Pottery district in Staffordshire, produced in a style of unparalleled minuteness and accuracy, and purchasable for less than two shillings.

In 1840 there were eighty of these large plates completed and published, and several more in hand; since which time a further advance has been made. Circumstances led to the withdrawal of the surveying staff from Scotland to Ireland some years ago, and the operations in the former country were for a time suspended. They were renewed however in 1838; and will be followed at some future time by the publication of engraved maps of Scotland. It has been proposed to effect this on the magnificent scale of six inches to the mile, for reasons which will be better understood when we have spoken of the Irish Ordnance Survey. Meanwhile we may state that down to the year 1841, about 340,000*l.* had been spent on the survey in England, Scotland, and Ireland. The sale of the maps is solely as a national benefit; it is not intended to pay the expenses of the survey. Great indeed would be the selling price, to effect this.

[To be continued.]

THE HAREEM OF IBRAHIM PASHA.

[From 'The Englishwoman in Egypt, by Mrs. Poole.]

The chief residence of his ladies is the Kasr ed-Dubárah, a fine house situated on the west of Cairo, on the eastern bank of the Nile, and justly their favourite retreat. After riding through the plantations of Ibraheem Pasha, which almost surround the palace, we arrived at the great gates of the Kasr, through which we entered a long road within the high walls covered with trellis closely interwoven with vines. At the end of this we dismounted, and walked on a beautiful pavement of marble through several paths, until we arrived at the curtain of the hareem. This being raised, we were immediately received by a young wife of Mohammad 'Alee, who addressed my friend Mrs. Sieder in the most affectionate terms, and gave us both a most cordial welcome. In a moment a crowd of ladies assembled round us, vying with each other in paying us polite attention; and having disrobed me, they followed us (the wife of the viceroy with us leading the way) to the grand saloon.

This is a very splendid room, paved with marble, as indeed are all the passages, and, I imagine, all the apartments on the ground-floor: but as several are entirely covered with matting, I cannot assert this to be the case. The pavement in the saloon is simply white marble, the purest and best laid I have seen in the East. The ceiling (which is divided into four distinct oblong compartments) is painted admirably in stripes of dark and light blue, radiating from gilded centres, from each of which hang splendid chandeliers containing innumerable wax-lights. The corners and cornices are richly decorated. The pavement under the two centre compartments is not matted, but the two ends, to the right and left on entering, are covered with fine matting, and fitted with crimson divans.

The windows are furnished with white muslin curtains edged with coloured fringe, some pink and some blue. All the looking-glasses (of which there are perhaps six in the saloon) are furnished with festoons and curtains of pink and blue gauze. There is one table with a cover of pink crape embroidered in stripes of gold, and having upon it a large glass case of stuffed birds. On either side of the door are fanciful stands for large square glass lanterns, composed of pillars, round which are twined artificial flowers. The windows are European in form, and the hareem blinds are composed of tasteful iron-work; I can scarcely say filigree, the pattern is too bold. The entire interior

decorations are in light and summer taste, and the saloon charmingly cool.

We crossed to an apartment on the opposite side, where the same lady placed us on the divan and seated herself by our side. This room is entirely covered with matting, and furnished with most luxurious divans, extending round three sides, not raised (as is usual) on a frame about a foot or more in height, but entirely of cotton, forming mattresses two feet in thickness, placed on the ground. These are covered with very gay chintz, as are also the cushions which incline against the walls; and at the right and left upper corners are distinct square cushions, covered with white muslin embroidered with black braid, and each having black cushions to correspond. Above all these there is a row of small cushions, covered with white muslin and embroidered with black, corresponding in pattern with the corner seats. The curtains resemble those in the saloon.

Here we received coffee, which was handed to us by the chief lady of the household, the treasurer, a particularly lady-like person, to whom it was handed by a lady who bore it on a silver salver, attended by several others; one carrying the little coffee-pot in a silver vessel, suspended by chains, and also used as a censer, containing burning charcoal. The whole group was most picturesque, and many of the ladies were fair, young, and beautiful.

[Coffee Service.]

The lady of the Páshá then proposed our returning to the saloon, that she might conduct us to the widow of Toosoon Páshá, and to the daughter of Mohammad 'Alee Páshá, who were sitting at the upper corner. I found the former lady seated on a cushion on the ground, next to the right-hand corner, and the daughter of the Viceroy took the seat of honour, which was also a cushion placed on the ground. Numerous ladies and slaves were in attendance; all standing in a line before the edge of the mat.

We were soon joined by another wife of the Páshá, the mother of Mohammad 'Alee Bey (a boy about nine years of age); her designation is "The lady, the mother of Mohammad 'Alee Bey."

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Soon after noon, dinner was announced; and the widow of Toosoon Páshá led the way to a room adjoining the saloon, where a most elegant dinner was arranged, on a very large round silver tray, placed on a stool, and surrounded by cushions. The passages we passed were occupied by innumerable black female slaves, and some eunuchs, dressed in all the variety of gay Eastern costume, and forming a curious contrast and a most picturesque back-ground to the ladies and white slaves who surrounded and accompanied us. On either side of the door several ladies, each with an embroidered napkin hung on her right arm, held silver ewers and basins that we might wash our hands before advancing to the table.

No one was admitted to the table but the widow of Toosoon Páshá, the daughter of Mohammad 'Alee Páshá, the mother of Mohammad 'Alee Bey, with ourselves, and a lady of great importance in the East, the foster-mother of 'Abbás Páshá. The place of the younger wife was vacant.

The tray was covered with small silver dishes filled with various creams, jellies, &c., and most tastefully garnished with exquisite flowers. In the centre was a fore-quarter of lamb, on piláv. I was truly glad, on this occasion especially, that my home habits had been Eastern; had the case been otherwise, a joint of meat to be eaten without knife or fork would have been a formidable object; for, under any circumstances, I should not have anticipated that the widow of Toosoon Páshá, who is also the mother of Abbás Páshá, and who, being the eldest, was the most honoured at table, would have distinguished me as she did, by passing to me, with her own fingers, almost every morsel that I ate during dinner. The mother of Mohammad 'Alee Bey in the same manner distinguished Mrs. Sieder.

The lamb was succeeded by stew; the stew by vegetables; the vegetables by savoury cream, &c., composing an innumerable variety; and each was removed, and its place filled, when perhaps only tasted. Sweet dishes, most delicately prepared, succeeded these in rapid succession; and, with one exception, all were in silver dishes. Ladies attended close to our divan with fly-whisks; behind them about thirty formed a semicircle of gaily-dressed, and, in many cases, beautiful women and girls; and those near the door held large silver trays, on which the black slaves who stood without placed the dishes, that the table might be constantly replenished.

Black female slaves in the houses of the great are not permitted to enter an apartment where are visitors; but black eunuchs, when favourites with their masters, are constantly to be found in the very centre of a high hareem.

In presenting the morsels to me, the widow of Toosoon Páshá constantly said, "In the name of God;" and these words are always said by the Muslims before eating or drinking. "Praise be to God" is the grace after either.

There is one particularly agreeable custom observed after dinner in the East; each person is at liberty to leave the table when satisfied. To a European it is really a relief to do so, the dishes are so numerous, varied, and rich.

English and Foreign Nettles.—The stinging properties of the British nettles are feeble when compared with those of some Indian species, which are so virulent as to cause the most excruciating pain, and even sometimes death. Leschenault de la Tour gives the following account of the effects of touching the Urtica crenulata, a specimen of which was growing in the Botanic Garden at Calcutta:—"One of the leaves slightly touched the first three fingers of my left hand; at the time I only perceived a slight pricking, to which I paid no attention. This was at seven in the morning. The pain continued to increase; in an hour it became intolerable; it seemed as if some one was rubbing my fingers with a hot iron. Many of the genera have one or two species which produce eatable fruit, though the fruit of the other species of the same genus is unwholesome, an anomaly rarely to be met with in any other order except the Solanaceæ (night-shades); and though the milky juice of most urticaceous plants is poisonous, it affords, in one species, the cow-tree, a wholesome beverage." Besides these, there are other peculiarities characteristic to the order. The leaves, for example, are alternate, and covered with asperities, or with hairs furnished with a stinging secretion; and this stinging property, so well exemplified in the common nettle, is participated in by many others whose acridity is intense. A narcotic principle is highly developed in the hemp, and the toughness of the fibre of that plant is common to numerous others of the order; while many species furnish caoutchouc of the finest quality.